This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claims 1-6 (canceled).

Claim 7 (new): A method for adapting a pump power of an optical amplifier, comprising:

receiving an optical wavelength multiplex signal having a number of channels of different wavelengths;

amplifying the optical wavelength multiplex signal;

measuring a state of gain for the amplification

detecting a change in input or output power, wherein when the change of input power occurs within a time interval that is smaller than a reaction time of the amplifier, the accumulated input and output power is measured, and, using the measured state of gain, a new pump power value is determined so that the gain curve of the amplifier becomes substantially constant.

Claim 8 (new): The method in accordance with claim 7, wherein the state of gain is measured from a stable state.

Claim 9 (new): The method in accordance with claim 7, wherein the new pump power (P_{pump}^{after}) is defined in accordance with a switching process changing the input power by the following characteristics:

$$P_{pump}^{after} = P_0 \cdot \left[\exp\left\{ \frac{P_{eff}^{after}}{P_0} \right\} - 1 \right] \text{ with}$$

$$P_{eff}^{after} = P_{eff}^{before} + \frac{\overline{\lambda}_{signal}}{\lambda_{pump}} \cdot \frac{1}{G_{norm}} \cdot \left\{ P_{sig,out}^{after} - P_{sig,in}^{after} - P_{sig,out}^{before} + P_{sig,in}^{before} \right\} \text{ and}$$

$$P_{eff}^{before} = P_0 \cdot \ln\left\{ 1 + \frac{P_{pump}^{before}}{P_0} \right\}$$

with the variables ($P^{after}_{sig,out/in}$) being measurement variables which are recorded within a period of a few 10 μs after the switching process in which the gain of the amplifier changes, and wherein

($P^{after}_{sig,out}$) designates the accumulated output power after the switching process,

($P^{after}_{sig,in}$) is the accumulated input power after the switching process,

($P^{before}_{sig,out}$) is the accumulated output power before the switching process,

($P^{before}_{sig,in}$) is the accumulated input power before the switching process,

($\overline{\mu}_{signal}$ and μ_{pump}) are the average signal wavelength after the switching process or the pump wavelength, (G_{norm}, P_0) are two calibration parameters of the optical amplifier, (P^{before}_{pump}) is the measured pump power before the switching process and $p^{before/after}_{eff}$ are effective powers which do not take account of any loss mechanisms.

Claim 10 (new): The method in accordance with claim 8, wherein given an average gain of an EDFA amplifier without smoothing filter, the new effective pump power P^{after}_{eff} is calculated in accordance with the characteristic:

$$P^{after}_{eff} = P^{before}_{eff} + \frac{\overline{\mu}_{signal}}{\mu_{pump}} \cdot \frac{G_{sig} - 1}{G_{norm}} \cdot \left\{ P^{after}_{sig,in} - P^{before}_{sig,in} \right\}$$

with ($G_{sig} = \frac{P^{before}_{sig,out}}{P^{before}_{sig,in}}$) designating the ratio of the average gain over the entire wavelength range and being assumed to be approximately constant before and after the switching process.

Claim 11 (new): The method in accordance with claim 7, wherein for a slow change of the input power, the calculation and the setting are executed successively.

Claim 12 (new): The method in accordance with claim 8, wherein, during stable states, new values of the pump power are calculated and read into a table, said values serving as support points for an interpolation for setting new pump powers for switching processes.

Claim 13 (new): The method in accordance to claim 9, wherein for N pump sources the effective pump powers before the switching process $P_{eff,1}^{before}$ of each pump source are weighted and accumulated with the quotients from the average signal wavelength $\overline{\mu}_{signal}$ and the relevant pump wavelength μ_{pump} according to the formula

$$\mu_{eff}^{before} = \sum_{i=1}^{N} \frac{\mu_{pump}}{\mu_{signal}} \cdot P_{eff,i}^{before},$$

and the effective overall pump power after the switching process X_{eff}^{after} is calculated from the measured accumulated input and output powers before and after the switching process and the calibration parameter G_{norm}:

$$\mu_{eff}^{after} = \mu_{eff}^{before} + \frac{1}{G_{norm}} \cdot \left\{P_{sig,out}^{after} - P_{sig,in}^{after} - P_{sig,out}^{before} + P_{sig,in}^{before}\right\}.$$